CANADIAN FIELD PEAS.

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The term Canadian field peas, or, as it is more commonly expressed, "Canada field peas," is used with much latitude in this country. Ask a pea grower in the United States as to the variety of seed which he sowed and the almost invariable answer given is: "I sowed Canada peas." That may mean that he grew any one of nearly one-hundred varieties. The answer is significant. It implies, first, a great lack of knowledge with reference to varieties on the part of those who grow peas, and, second, that much of the seed used in the United States is imported from Canada, although we have large areas unrivaled in their adaptability to the growing of peas.

The pea crop is one of the most important in Canada. In the Province of Ontario alone the average area devoted to the production of peas for the thirteen years ending with 1894 was 691,392 acres. The average annual yield during the period named was 13,982,527 bushels, or an average of 20.2 bushels per acre; the greater portion of this crop is fed upon Ontario farms.

In striking contrast with the magnitude of the pea crop in Canada is its insignificance in our own country. While the area devoted to peas in Ontario is not far behind that devoted to winter wheat, the pea crop is so insignificant, relatively, in this country that it has not been given a fixed place in the Government crop reports. In Minnesota it is not mentioned in the yearbook of statistical returns, and the same seems to be true of nearly all the States in the Union. We are to-day importing much of our seed from Canada, in the face of an import duty of 20 cents per bushel.

VARIOUS USES OF THE PEA CROP.

No other grain crop except perhaps oats can be devoted to so great a variety of uses. The grain is possessed of a relatively high feeding value, and the same is true of the straw, as will be readily apparent by reference to the chemical analysis of each. As a pasture for certain kinds of live stock, peas may be made to serve an excellent purpose. The value of the crop for soiling and fodder uses is very great, and as a fertilizing crop peas are excelled only by clover.

There is no kind of live stock on the farm to which peas can not be fed with positive advantage when they are to be had at prices not too high. They are not commonly fed to horses, since they can seldom be spared for such a use, but they make a good food for horses at work, and colts during the period of development, if given as a part of the grain food. As a food for fattening cattle, peas are probably unexcelled. Much of the success which Canadian feeders have achieved in preparing cattle for the block has arisen from the free use of peas in the diet. During the first part of the finishing period they will be found peculiarly helpful in making beef, owing to their relative richness in protein, but they are also a satisfactory food at any stage of the fattening process. During the first half of the finishing period peas will be found superior to corn, but toward the close of the same corn could probably be fed with greater relative advantage. Peas with oats or wheat bran make an excellent grain food for cattle that are being fattened. Speaking in a general way, peas should form about one-third, by weight, of the meal fed, but, as every feeder knows, the relative proportions of the meal used should vary somewhat as the season of fattening progresses.

Peas furnish a good food for milch cows. They have been found peculiarly beneficial for building up dairy cows when "out of condition," and for sustaining them in fine form, and they are also excellent for milk production. When given along with oats and bran to cows in milk, they may usually form from one-third to one-half of the grain portion by weight.

Peas, when fed with judgment and care, supply an excellent food for swine at all stages of development. They are well adapted to the sustenance of brood sows during the nursing period, for the reasons that have been given for their use with cows giving milk. With shorts, ground oats, or wheat bran, they may be made to form one-third to one-half the grain portion. Peas are superior to corn as a food for pigs at any time prior to the fattening season; hence they may be fed to them more freely, but in no instance should they form the sole ration before the finishing period begins. During the fattening period peas are unexcelled when fed as the sole grain food. They promote growth, while they fatten in excellent form, and they furnish a sweet, firm, and excellent quality of pork.

Along with oats, in, say, equal parts, by weight, peas make good grain ration for ewes in milk, and also lambs, more especially when the latter are for the early market. They may be used in greater proportion to fatten ewes quickly after the lambs have been weaned. When sheep are being fattened for the block in winter, no grain food can be fed which will be found more suitable than peas and oats. When fed to sheep or poultry, or to brood sows in winter, peas do not require to be ground. For all other live stock it is considered advantageous to grind them, but in some instances they are soaked for

feeding to swine. When so prepared, they are frequently fed to growing swine when on pasture, and in order to insure due mastication they should be fed on a floor.

When pea straw is well cured, it is more relished by horses, cattle, and sheep than the straw of rye, wheat, barley, or even oats. Animals which have never eaten it may not take kindly to it at first, but soon learn to eat it with a relish. The value of the straw, however, depends largely upon the stage at which the crop is harvested, the mode of harvesting, and the perfection of the curing process. Pea straw harvested rather under than over ripe, and then properly cured, will be eaten readily, but when allowed to get dead ripe, live stock will eat little of it unless compelled to do so by hunger. If harvested with the old-fashioned revolving horserake, so much of the soil adheres to the straw that it is not relished by any class of live stock; and when rain falls upon the straw while it is curing, it becomes bleached and loses much in palatability. Two or three smart showers falling upon pea straw greatly injure it. When cut with the scythe or the pea harvester, cured properly, and then housed or carefully stacked, the straw, except that of some of the coarsest varieties, is nearly equal to clover hay in feeding value, especially for sheep.

Peas are more commonly used as a pasture when sown in conjunction with some other kind of grain, and since they are more easily injured by the trampling of live stock than other grain crops, it is usual to pasture them only with sheep and swine. When sown with oats or barley, peas make a good summer pasture for sheep. The greatest objection to such pasture is in the earliness of the season at which it is produced. Of course, it may be grown later, but will not produce so abundantly. One-fourth of an acre grown at the Minnesota Agricultural Experiment Station in the spring of 1895, under the supervision of the writer, furnished pasture sufficient for one sheep for 345¾ days. The pasture was eaten down three times successively, with a suitable interval between each season of pasturing. The plat was then sown with rape, and this in turn was pastured off. The great value of peas as a pasture for swine is far too little understood.

Peas grown in conjunction with some other kinds of grain are of great value as a soiling crop, owing, first, to the larger yields obtained (from 10 to 20 tons per acre may be expected on average soils); second, to the high nutritive value of the food, combined with its palatability; and third, because of its timeliness. This crop is ready as soon as the spring grasses begin to fail, and it may be made to continue in season until corn is ready. It is excellent for all kinds of live stock, but especially valuable for dairy cows.

The advantages resulting from growing peas in conjunction with other grains for fodder are many. They include the following: First,

larger yields may be obtained from growing these mixtures than by growing the grains used in them singly, and the increased yield extends to the grain as well as to the straw; second, when fodder is thus grown it may be fed directly to the animals; it is not necessary, usually, to chaff it with the cutting box, and the labor and cost of first thrashing and grinding the grain are avoided; and third, a pasture crop, such as rape or rye, may follow the same season. Such a system will be found most helpful as an aid in destroying weeds. As the relative areas adapted to growing these foods far exceeds those adapted to growing peas for the grain, it is probable that in the near future they will be most extensively grown for soiling and fodder uses.

Like all leguminous crops, peas have the power of extracting nitrogen from the air and of depositing it in the soil for the use of other crops which follow. Hence it is that the soil on which a crop of peas has been harvested is richer in nitrogen than before the peas were sown upon it. In this we have one explanation of the practice which became general in Ontario, of following peas with winter wheat. Peas could thus be made to bring more nitrogen to the soils of this country every year than is now purchased annually by the farmers at a cost of millions of dollars.

WHY THE PEA CROP HAS BEEN NEGLECTED.

That so valuable a crop should not have received more attention is indeed surprising. Chief among the reasons why it has been so neglected are the following: The lack of knowledge as to its merits, the difficulty in procuring seed, the want of suitable machinery for harvesting the crop, and the small measure of attention given to it, relatively, by the experiment stations. But little is known of the value of the pea crop by the average farmer.

The scarcity and costliness of seed have hindered many from growing peas. The average prices paid to seedsmen in the United States during recent years for good, clean seed have been from $1 to $1.25 per bushel. The Ontario farmer usually raises his own seed or buys it for about 1 cent per pound. Suppose a farmer should buy but 1 bushel of seed and sow it with care: he may expect in the autumn 10 bushels of seed wherever the conditions are favorable to growing the crop. Why should not farmers generally raise their own seed peas?

The lack of suitable machinery for harvesting peas has probably more than anything else hindered the extension of their growth in the United States. Where peas have to be harvested with the scythe, they are not likely to be grown to any considerable extent; but, as shown elsewhere, pea harvesters are now in use in Ontario which will cut a field of peas as quickly as a field of hay of equal area could be cut.

Very little attention has been given to this crop by the experiment stations of the continent. But little that can be regarded as of much value to the farmer is to be gleaned from the reports. The Ontario station, at Guelph, is an exception. The writer, when in charge of that station, imported many varieties from Europe and other countries for experimental uses, and the cooperative experiments with the best of these varieties, which have since that time been carried on by the farmers in various parts of Ontario, have been of great value in determining the most suitable kinds for the different sections of the country. Here is a field for experimentation in which the several stations, more especially those of the North, can render most valuable service to the States in which they are located.

AREAS ADAPTED TO PEA CULTURE IN THE UNITED STATES.

Without any doubt there are vast areas in our favored country well adapted to growing peas as a grain crop. But the areas in which the crop can be grown for pasture, for soiling uses, and for fodder are vastly greater, as heretofore intimated; for where they can be successfully grown as a grain crop they can also be grown for the other uses named. In the present state of our knowledge it would be impossible to name exactly all the areas in which peas can be successfully grown for any of the uses mentioned, and it would be even more hazardous to specify where they can not be grown. But these areas may be defined in a general way.

Peas can be successfully grown as a grain crop throughout New England. They are successfully grown in northern Michigan, northern and eastern Wisconsin, and northern Minnesota. They will also grow well in North Dakota, Montana, Idaho, Oregon, and Washington. In northern Ohio, southern Michigan, southern Wisconsin, and southern Minnesota they are not so sure a crop as in the areas named, but sometimes they produce well.

Southward from the States just named peas can not always be depended on to yield well. The summer temperatures are too warm for them. Even though they should produce a good crop of straw, if a hot wave should pass over them while in bloom, they would not fruit well. But in all this section of country great use can be made of peas when grown with other crops for pasture, for summer feeding, and for fodder. Still farther to the south the wisdom of giving much attention to this crop is open to question; the Southern cowpea has taken its place there.

GROWING PEAS FOR DIFFERENT PURPOSES.

In discussing the growing of peas as a grain crop, problems relating to soils, rotation, tillage, seed, varieties, harvesting, storing, and thrashing require to be considered.

Adaptability in soils.—Peas may be grown successfully on a variety of soils, but those designated clay loams, and which are well supplied with lime, are best adapted to their growth. However, good crops may be obtained on the stiffest clays. The potash element in these favors the growth of peas. Light, leachy sands, being deficient in moisture, do not produce enough of growth of vine, and black humus soils produce too much. Overwet soils are wholly unsuited to the growth of peas.

Place in the rotation.—Theoretically, peas should not come after meadow or pasture, since they are capable of gathering nitrogen from the atmosphere, and in consequence do not need the sustenance furnished in the decay of grass roots so much as other grains; but in practice they serve the end of quickly subduing such soils by promoting the rapid decay of the sod and so putting the land in excellent condition for the crop which follows. Peas may be assigned any place in the rotation, but the aim should be to have a grain crop follow which is hungry for nitrogen.

Preparing the land.—In climates where peas can be grown at their best, namely, climates with low winter temperatures, the land for peas, as for nearly all grain crops, should be plowed in the autumn; but peas will do better than the cereals, relatively, on spring-plowed land. A fine pulverization of the soil is advantageous, but it is not so necessary for peas as for other grain crops, since the pea is a hardy and vigorous grower.

Sowing the seed.—Some writers advocate sowing the seed broadcast and then plowing it under. On heavy soils this method would bury the seed too deeply. On prairie soils it promotes the rapid evaporation of soil moisture. On fall-plowed lands the better plan is to prepare the seed bed by pulverizing it and then to sow the seed with the grain drill. When broadcasted and covered with the harrow only and rain follows, much of the seed will be exposed; but the writer has grown excellent crops on spring-plowed stiff clays from hand sowing without any previous pulverization. When such lands are carefully plowed, the peas fall in the depression between the furrow slices, and the subsequent harrowing covers them. Peas should be buried less deeply on stiff clays and more deeply on the soils of the prairie. The depth may be varied from 2 to 4 inches. The pea crop should be sown as soon as the soil can be worked freely; but it will suffer less, relatively, than the other grain crops if the sowing has to be deferred. In sections where the pea weevil (*Bruchus pisi*) is prone to injure the crop, late sowing will shield the same from harm, but there remains the danger of loss from mildew.

The quantity of seed required will vary with the character and condition of the soil and with the variety of seed sown. Rich and moist soils do not require so much seed as where the opposite conditions prevail. The amount of the seed sown should usually increase with

the size of the pea. The quantities to sow per acre will vary from 2 bushels with the smaller varieties to 3½ bushels of the larger sorts. One great difficulty to be encountered in growing peas on prairie soils is the usual luxuriance of weed life, but this may be held in check by harrowing the crop before it appears above the surface. Harrows with teeth which may be set aslant are the most suitable for the work.

Varieties to sow.—The most suitable varieties of peas to sow will depend somewhat on soil and climatic conditions; and the best way, probably, to determine which kinds are best suited to the varied conditions of each State would be through experimentation on what may be termed the cooperative plan, as practiced in Ontario. This plan in outline is as follows: The station furnishes the seed of a number of proved varieties to farmers in different sections of the country. These varieties are to be grown under similar conditions, and they are also to report the results to the station at a given date. The results are then summarized and made public. The farmer keeps the grain which he grows as his compensation.

Several varieties were thus tested in Ontario in 1894. The three which stood first in point of yield were the Prussian Blue, Canadian Beauty, and Tall White Marrowfat. The respective average yields were 27.9, 27.1, and 26.8 bushels per acre. The yields of straw were not far different, nor was there much difference in the average time of maturing. The Prussian Blue is one of the most hardy, prolific, and reliable sorts grown in Ontario. The peas are blue in color and they weigh well. This variety also gave the largest average yields in the cooperative experiments of 1895. The Canadian Beauty is a handsome pea, white in color, and somewhat large in size. The Tall White Marrowfat is of large size and it is a vigorous grower. The four best yielding varieties grown at the Ontario experiment station for four years ending with 1894 are the Early Britain, White Wonder, Mummy, and Prussian Blue. The average yields were very similar. The Early Britain, imported from England in 1889, has proved a uniformly good yielder, but the peas are a little brownish in color and somewhat irregular in shape. The White Wonder, imported from New Zealand in 1890, is a very promising variety. It is a free grower, a good yielder, and the pea itself is attractive in appearance. The Mummy, a well-established variety, is a strong grower, but the straw is coarse. The pods are much prone to cluster about the top of the vines. Among the other useful varieties grown at the Ontario station are the Centennial White, Cleveland Advancer, and the Golden Vine. The last named is an old standby. When farmers speak of "Canada peas" they have reference probably to this variety more often than to any other. All the varieties named should do at least fairly well in the New England States, and in northern Michigan and Wisconsin. Through the various States of the Northwest the

following varieties stand high in favor with the farmer, namely, the Chancellor, the White Marrowfat, and the Black-Eyed Marrowfat. The Chancellor is an early and productive variety.

Harvesting the crop.—Until recent years the pea crop was harvested with the scythe or with the old-fashioned revolving hayrake. The first method is slow; the second shells out many of the peas, and it so covers the vines with soil as to render the straw practically unfit for use. Happily a pea harvester has been introduced by the aid of

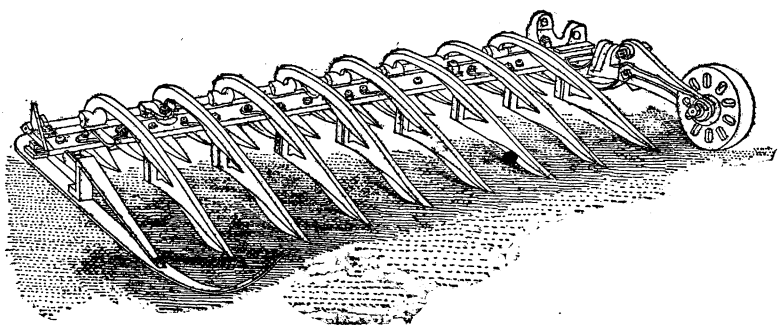

FIG. 46.—Pea harvester.

which the crop may be harvested speedily and in excellent condition on level soils. It is simply an attachment to an ordinary field mower, as shown in fig. 46.

The guards in front lift up the peas so that the knife can cut them cleanly. The cut peas fall behind the mower in a string-like row, or swath, and two men with forks bunch them and lay them aside out of the way of the horses. Three men and a span of horses may thus

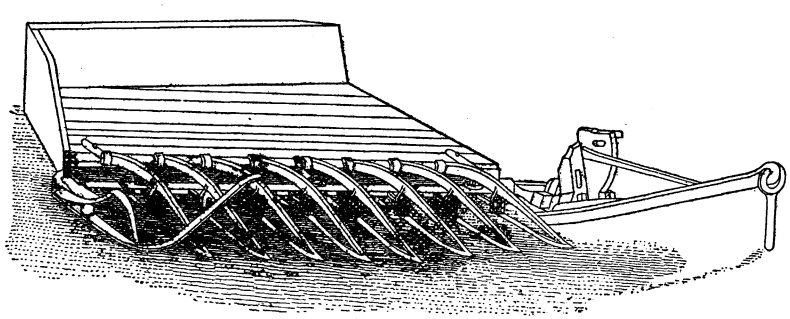

FIG. 47.—Pea harvester with platform.

harvest 10 acres in a day. This attachment for harvesting peas is made in Canada, and those now in use in the West have all been imported. On rear-cut mowers a platform is sometimes used, as shown in fig. 47.

With this attachment, one man walks behind and with a fork throws the peas off in bunches. But the platform is of doubtful advantage unless the crop is evenly ripened, not too heavy, and free from standing weeds of strong growth. Where the land has been

plowed in ridges, with furrows more or less deep between them, the working of the machine will be seriously interfered with.

Storing the crop.—It is usual to turn the bundles over once to facilitate drying while they lie on the ground. They require hand loading. The crop may be stored under cover or put into stacks, as with other grain, but it should be borne in mind that peas when in the stack do not readily shed rain, and therefore the stacks should be carefully topped out with some substance, such as blue grass or native prairie hay. When the thrashed straw is preserved in stacks the same precautions are necessary.

Thrashing the crop.—Where only a small quantity is grown annually, and this with a view to provide seed to sow for pasture, soiling, or fodder uses, there is no better way of thrashing the peas than by using a flail or by treading them out with horses. The seed is not then broken. Where a large acreage is grown, it is necessary to thrash peas with a thrashing machine, and the best work is done by using the "bar concave," as shown in fig. 48.

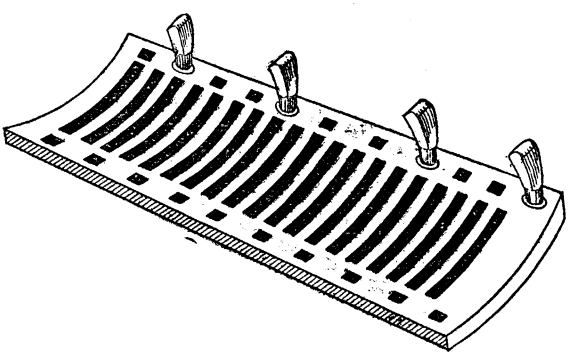

FIG. 48.—Single concave thrashing machine with four teeth.

From this concave all the teeth should be removed except four. These hold the straw in check long enough to enable the cylinder teeth to beat out all the peas. The machine should not run at a high rate of speed. More or less of the seed is likely to be broken. The broken grains, however, may be nearly all removed when preparing the crop for seed or for market by using fanning mills suitably equipped with sieves. When the crop is wanted for feeding uses, the breaking of the peas does not, of course, lessen its value.

The great value of peas for various uses has already been dwelt upon. It only remains, therefore, to speak of the methods by which they are grown.

When peas are grown in conjunction with other grain for pasture, the mixture should be sown somewhat thickly. For sheep 1 bushel of peas may be taken as the basis of the mixture, and from $1\frac{1}{2}$ to 2 bushels of other grain. When seed drills are used, the seed should be mixed before it is sown. Under other conditions it would be necessary to plow the peas in lightly, and then sow the other grain and cover it with a harrow. Peas and oats or peas and barley may be grown as a pasture for swine in the same manner as for sheep, but it is generally thought better to reduce the proportion of peas when the pasturing is to begin at an early stage in the growth of the plants, as swine break down the pea vines to a greater extent than

sheep. Hitherto it has been common to sow peas alone as a pasture for swine, and to defer pasturing them until the peas in the pod are about ready for table use; about 2 bushels of seed per acre will suffice. Swine should be accustomed to such pastures by degrees, because the sudden change of diet might be injurious to them. The season of pasturing may be prolonged by sowing the peas at successive periods, with a due interval between them.

When peas are grown as a soiling crop, the relative amounts of seed used are much the same as when they are sown to provide pasture for sheep, and they are also sown in the same way. Oats, however, is the favorite grain to mix with the peas, and the proportions of seed used per acre are usually 1½ bushels of the former to 1 bushel of the latter; but no definite rule can be laid down as to the relative amounts of seed that should be used when growing these mixtures for soiling or for fodder uses. The richer the land the larger the proportion of the peas that should be used, lest the oats should unduly overshadow them. Every farmer will have to determine for himself the relative quantities of seed which will best suit his conditions.

The cutting and feeding of the crop may commence as soon as the heads of the oats begin to appear, and it may be continued until the crop is approaching maturity. When not all wanted for soiling uses, the residue may be cut and cured for winter feeding. Generally the best yields will be obtained from the seed sown earliest in the season.

For this purpose the same methods of growing peas may be adopted as when they are grown for soiling uses, with the difference that more varieties are frequently used. The harvesting should take place when the dominant grain used in the mixture is nearly but not quite ripe. When the respective quantities of seed have been correctly adjusted, the crop can be harvested with the binder in a normal season, but in case it should be thrown down by storms the mower would then have to be used.

It has already been stated that the pea crop brings nitrogen to the soil, and is therefore a fertilizer howsoever it may be grown; but its value in fertilizing and also in improving the mechanical texture of the soil is greatly enhanced when it is grown as a green manure. When soils become so impoverished that good crops can not longer be grown on them, they may be quickly renovated and also cleaned by plowing under a pea crop preceded by winter rye. The rye should, of course, be sown in the autumn, and plowed under in the spring when the heads begin to appear. The peas should be sown immediately, and in turn plowed under when in bloom. Ground thus treated would be fertilized and cleaned in one season. Its tilth would be much improved, and its power to hold moisture would be greatly increased. To a farmer in the dry Northwest the benefit last mentioned would probably be the greatest. The high price of the seed at present stands seriously in the way of growing peas expressly for fertilizing uses.